AN EVALUATION OF THE NEED
TO REGIONALIZE RECRUITMENT ADVERTISING

A Thesis Presented to the Faculty
of
California State University, Hayward

In Partial Fulfillment
of the Requirements for the Degree
Master of Business Administration

By

Christine L. Thomas

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by
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and that I was something worthy of that belief. Above all,
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CHAPTER I

THE PROBLEM AND ITS SETTING

The Statement of the Problem

This research proposes to examine and evaluate the need to regionalize recruitment advertising in a nationwide recruitment effort through the enhancement of those issues deemed important by software engineers from a particular region who are considering a job change.

The Subproblems

The first subproblem. The first subproblem is to establish relevant regional divisions within the United States.

The second subproblem. The second subproblem is to determine what issues are deemed important by software engineers within the established regions who are considering a job change.

The third subproblem. The third subproblem is to examine and evaluate a company's recruitment advertisements for software engineers that appear in regional and national print media.
The Hypotheses

The first hypothesis. The first hypothesis is that there are specific areas within the United States from which software engineers are recruited and that these areas can be used to divide the country into regions.

The second hypothesis. The second hypothesis is that software engineers from different regions within the United States have different priorities regarding the issues involved in a job change.

The third hypothesis. The third hypothesis is that a company will receive more responses from software engineers by using an advertisement that addresses those issues mentioned in the second hypothesis in contrast with an advertisement that addresses merely the job and the company.

Delimitations

The study will not attempt to determine the quality of candidates responding to recruitment advertisements.

The study will not attempt to evaluate any recruitment techniques beyond the use of advertisements in print media.

The study will not attempt to evaluate any recruitment advertisements in print media beyond newspapers, or trade and professional journals.
The study will not attempt to evaluate the impact of the regional labor market with regard to software engineers.

The study will not attempt to correlate seasonal factors and the response rate of recruitment advertisements.

The study will not attempt to evaluate the entire geographic United States outside of the regions established in subproblem one.

The study will not attempt to evaluate individual personal issues, but will focus on generalized group issues relevant to software engineers within a region.

The Definitions of Terms

Print media. Print media is a means of written communication that reaches the general public and carries advertising.

Software engineer. A software engineer is a professional employee who engages in the designing, developing, and troubleshooting of programs and routines required to utilize the capabilities of computers.

Assumptions

The first assumption. The first assumption is that recruitment efforts will continue to be directed towards software engineers.
The second assumption. The second assumption is that software engineers will be representative of the broad category of engineers.

The third assumption. The third assumption is that the regions established in subproblem one will be representative of the United States as a whole.

Importance of the Study

Recruitment is the process of acquiring new employees. The recruiter's goal is to acquire the best available people to enhance the prosperity, growth, and survival of the organization.\(^1\) Recruiters have several sources and techniques at their disposal for the acquisition of these employees.

Advertising continues to be the most widely used and generally the most effective means of recruiting.\(^2\) Moreover, advertising is the most flexible and the most valuable tool available to the recruiter.\(^3\) The more frequently selected advertising media are newspapers,

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consumer magazines, and trade journals. The goal of recruitment advertising involves persuading prospective employees to make two decisions that are ranked among the ten most stressful experiences in a person's life. Those decisions are changing jobs and moving, if the job change requires relocation.

A nationwide survey conducted by Personnel Journal of top recruitment advertising agencies concluded that 84 percent of recruitment advertising is for engineering and technical positions. "Of that 84 percent, 16 percent do more than 50 percent of their recruiting in engineering, and 11 percent do more than 20 percent of their business in this market. Only 16 percent of the respondents did not work the engineering market at all."

What issues does a software engineer consider when exploring the job market? Does he or she consider the benefits offered by a company? Do these considerations vary among geographic regions within the United States? Are the important issues related more specifically to the job and

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6 Elizabeth S. Palkowitz and Michelle M. Mueller, op. cit., p. 126.
the company? Will the company receive comparable results from an advertisement written for the entire country or will the results improve if the advertisements are written to meet the concerns of software engineers within a geographic region? This study proposes to elucidate these questions.
Recruitment Methods for Attracting Employees

The ability to attract talented, productive employees is vitally important to an organization's successful growth. Erwin Stanton believes that employees can be the key ingredient to a company's success.

The quality of a company's personnel is frequently the single factor that determines whether the organization is going to be successful, whether it will realize a satisfactory return on its investment, and whether it will reach its basic objectives. Indeed, if proper personnel selection was vital during the years when the United States was predominantly a production-oriented economy, it is even more important now that the major part of our nation's gross national product has its source in rendering services.¹

The employees generate the ideas and products that allow a company to generate revenue and profits. "Good employees can improve a bad year, poor employees can reverse a good one."²


Recruitment is "the process of finding potential applicants for employment." Depending on the recruitment method used, the expenses incurred for hiring one employee can be staggering. As a result, the method should be chosen carefully. Moreover, the chosen method should be used in a manner which will recognize the full potential it offers. In an article for Personnel Journal, Margaret Magnus reinforces this notion.

Although companies may be using the same recruiting methods, how they use these methods—the creativity with which they approach the recruitment function, and the willingness to stretch and do something a little extra—are the distinguishing characteristics between successful and not-so-successful recruiters.

Various recruitment methods exist from which one or more might be chosen. But, why not use the method proven most successful? Robert LoPresto provides an answer, "Due to the individual differences of organizations, such as geographical location, size and makeup of work force, and type of industry, there is no standard recruitment package that will work for everyone."  

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R. LoPresto, op. cit., p. 12-1.
So, which method works best for an organization? The recruiter must examine several factors. What is the nature of the job to be filled? How much difficulty will be faced in an attempt to find good, qualified candidates? How much time can be spent on recruiting? The answers to these questions will help select the most appropriate recruitment method.

Personnel magazine conducted a survey to determine the methods most commonly used for recruitment. The results indicate that 85 percent used classified advertisements in newspapers. An examination of the results yields the most popular choices as well as a sample of available choices. Forty-one personnel managers responded to the survey. Never less than 41 percent of the respondents indicate using some form of print media advertising as at least one method of choice. Four of the top ten methods are of the print media advertising variety. The methods cover a wide range of sources both internal and external to the organization.

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### TABLE 1
THE METHODS MOST COMMONLY USED FOR RECRUITMENT

<table>
<thead>
<tr>
<th>Recruitment Method Used</th>
<th>Number of Respondents Using the Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classified advertisements in newspapers</td>
<td>35</td>
</tr>
<tr>
<td>Inhouse recruitment</td>
<td>34</td>
</tr>
<tr>
<td>Walk-in applicants</td>
<td>33</td>
</tr>
<tr>
<td>Private agencies</td>
<td>29</td>
</tr>
<tr>
<td>State agencies</td>
<td>29</td>
</tr>
<tr>
<td>College visits</td>
<td>24</td>
</tr>
<tr>
<td>Classified advertisements in specialized periodicals</td>
<td>24</td>
</tr>
<tr>
<td>Display advertisements in newspapers</td>
<td>22</td>
</tr>
<tr>
<td>Recruiting literature</td>
<td>18</td>
</tr>
<tr>
<td>Display advertisements in specialized periodicals</td>
<td>17</td>
</tr>
<tr>
<td>Job fairs</td>
<td>14</td>
</tr>
<tr>
<td>Recruiting team visits</td>
<td>11</td>
</tr>
<tr>
<td>Bonuses to current employees</td>
<td>11</td>
</tr>
<tr>
<td>Open houses</td>
<td>8</td>
</tr>
<tr>
<td>Radio spots</td>
<td>7</td>
</tr>
<tr>
<td>College placement offices</td>
<td>2</td>
</tr>
<tr>
<td>Television spots</td>
<td>1</td>
</tr>
<tr>
<td>Current employee referral</td>
<td>1</td>
</tr>
<tr>
<td>Referrals by others</td>
<td>1</td>
</tr>
</tbody>
</table>

**Recruitment Advertising**

Recruitment advertising is "the action of calling a job opening to the attention of potential employees, especially by paid announcements."  

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letter and resume to the applicants."\(^9\) "The chief value of advertising is that few other methods are likely to draw as many candidates. On the other hand, the majority of the candidates attracted by ads are not even close to becoming contenders.\(^10\)

The basic purpose of advertising is communication. Elizabeth Palkowitz and Michelle Mueller have gone further to establish five functions for recruitment advertising. First, an ad must attract the attention of the right people. The right people are those with the proper qualifications for the advertised position. Second, an ad must hold the interest of the reader by highlighting job features and the potential benefit to the applicant. Third, the ad must gain the acceptance of the reader. The advertisement should establish credibility for the job and the company. Fourth, the ad should convince the applicant that this opening is preferable to another company's opening. Finally, the ad should motivate the reader to take action and state how and what action to take.\(^11\)


\(^10\)R. Half, op. cit., pp. 46-47.

Recruitment advertising can be designed to cover a single market, a region, the entire United States, or even a foreign market. The advertisement can be manipulated to meet an organization's changing needs at any point in time or it can be designed to remain functional over a long period of time.

As with the selection of recruitment methods, selection of the advertising media is important. Research develops the information that leads to the appropriate advertising media as well as a more effective ad. Research can reduce the amount of advertising necessary because it can increase the quality and quantity of responses generated.

"Know thy audience" is the essential ingredient for recruitment advertising. Audience demographics should be considered when selecting the media and writing ad copy. The advertiser must determine who is to be reached and what response is desired. The chosen media will be appropriate for some organizations and inappropriate for others. The advertiser should ask questions that generate the information desired: "What is known about the target audience?" "What characteristics do they possess; for example, level of education, interests, background?" These

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12F. Coss, op. cit., p. 73.
questions will lead to a better understanding of the audience. Then, an appropriate medium can be chosen and an advertisement can be written that will be a more effective recruitment tool. Robert LoPresto said, "In advertising, the selection of the medium is just as important as the message."  

The importance of recruitment advertising is summarized by Frank Coss.

To say, "We shall advertise" does not necessarily mean "People will receive, understand, and act on our message." But even the most experienced advertising people sometimes forget that these two statements are not synonymous. The purpose of advertising, then, might be stated realistically as follows: To communicate as effectively as possible with regard to the message presented, the environment in which the advertising is used, the needs of the advertiser, the characteristics of the audience, and the limitations imposed by such factors as the media involved and the time and money available.

Recruitment Advertising in Print Media

Recruitment advertising utilizes several media formats. Examples of available formats are newspapers, magazines, television, radio, billboards, direct mail, technical and professional journals, minority publications, employment brochures, trade journals, company literature,

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14 F. Coss, op. cit., p. 23.
product literature, financial reports, internal publications, college newspapers, and electronic mail.

Typically, advertising is placed in some form of print media as pointed out in a survey conducted by Personnel Journal.

"Help Wanted" newspaper advertising is a $2.18 billion industry and represents about 95 percent of the dollars spent on all media, says The Newspaper Advertising Bureau, Inc. Almost all (94 percent) Personnel Journal subscribers say they use newspapers for recruitment advertising, and more than half (57 percent) run ads in trade publications or other magazines. One in ten use radio or television advertising and 6 percent use billboards to recruit employees.\(^{15}\)

Companies use newspaper advertising for any type of job in any type of labor market. Professional, trade, or technical journals provide a specialized market. Minority and college publications also expose a company's needs to a specialized market. As a result, newspaper advertising might be used to supplement ads placed in print media which provide the focused market.

**Recruitment Advertising in Newspapers**

The medium of choice for recruitment advertising is typically the newspaper. Deutsch, Shea & Evans, Inc., an advertising agency, explains why.

Study after study has shown that newspaper advertising is still the most effective recruitment

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\(^{15}\) M. Magnus, "Is Your Recruitment All It Can Be?" op. cit., p. 56.
medium. Geographical targeting and immediacy of response are the obvious advantages. . . . In the great majority of cases, studies have shown that newspaper ads are capable of producing the greatest and quickest number of qualified responses, and at the lowest cost-per-hire. 16

Newspaper advertising provides several advantages. First, advertising space can be purchased only days before publication. Consequently, a company's opening expeditiously appears before the public. In contrast, other print media typically require several weeks lead time. The fact that newspapers have known, established sections devoted to recruitment advertisements is a second advantage for using newspapers. Some newspapers include specialized career sections aimed at positions paying higher salaries. The economic advantage has already been briefly addressed and stems from several sources. An advertiser potentially experiences a low cost-per-hire as well as a low cost-per-reader within the market area. In addition, newspapers usually provide free typesetting for classified and classified display ads. The final advantage refers to market selectivity. The advertiser can select a newspaper which serves an area with a heavy concentration of prospects. 17


17 S. Gabriel (ed.), op. cit., p. 112.
Most major cities usually have one newspaper which carries the bulk of recruitment ads. Generally, the Sunday editions are the heaviest recruitment advertising days. For example, in California's San Francisco/San Jose area, the newspaper known for its recruitment advertising is the San Jose Mercury News. Many ads are run in both the Sunday and Monday editions. Moreover, the Monday edition has a section called "Professional Careers" that carries advertisements aimed at the professional employee. Some newspapers use other days as the heavy recruitment advertising day. For instance, The Wall Street Journal prints the bulk of their recruitment ads on Tuesday. Deutsch, Shea & Evans explains why Sunday and one specified weekday are the heavy recruitment days.

Sunday editions are the most widely used for recruiting purposes. One reason is that these frequently have more circulation than do daily editions. Another is that they reach the prospective applicant when he or she has more time to respond. Daily editions, research suggests, get their heaviest readership by job seekers in the early part of the week. Some newspapers offer special combination rates for advertisers who use a Sunday plus a given weekday edition, usually a Tuesday or Wednesday.\(^{18}\)

Advertisements typically appear in three areas of a newspaper: the classified advertising section, the sports section, and the financial or business section. The section chosen generally reflects the audience the advertiser wishes

\(^{18}\text{Ibid.}, \text{p. 112.}\)
to target. Ads aimed at professional, managerial, and technical positions are prevalent in the financial section. Engineers might find recruitment advertisements in the sports section. However, the purpose for placing ads in these sections is based on unfounded theory.

Classified display ads are generally in the classified ad section of the newspaper. They can also be placed in other sections of the newspaper, particularly the sports and business sections, on the often untested assumptions that (1) more people will see them in those sections and (2) these people are not active job seekers and therefore are of a higher quality than those reading the classified section.¹⁹

In conclusion, the decision to advertise in a newspaper only leads to further decisions. Each must be made with knowledge of the audience from whom the advertiser desires a response.

Recruitment Advertising in Magazines and Journals

A Personnel Journal survey concludes that trade journals are the second most popular choice for recruitment advertising. The reasons given for selecting these media include easy accessibility; long shelf-life; and large, consistent audiences.²⁰


²⁰ E. Palkowitz and M. Mueller, op. cit., p. 128.
Magazine and journal advertisements offer many opportunities as well as drawbacks. Deutsch, Shea & Evans offer five reasons for using this form of print medium. Many of these advantages parallel those of newspaper advertising.

Trade and professional journals offer selective recruiting. Since these publications focus on a particular industry or occupational field, an ad in a trade or professional journal will be exposed to those with that specialized talent. The trade journal directs its attention to many different occupations within a specific industry. The professional journal concentrates on different levels of a specific profession. *High Technology Careers* focuses on different occupations within the high tech industry; on the other hand, *IEEE Spectrum* concentrates on electrical and electronics engineers.

Some journals have organized recruitment advertisement sections. The ads are consolidated into one area of the publication; thus, a marketplace is established for the particular profession or industry. The special recruitment section usually augments ads placed throughout the journal.

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Advertising rates for journals tend to be less expensive than newspaper advertising rates. This is especially critical in a nationwide recruitment campaign. The low rates coupled with national exposure make journal ads more economical than expensive ads placed in several different newspapers across the country. In addition, journals tend toward a longer shelf life than newspapers. For long-term recruitment needs, the journal ad becomes more efficient.

Experienced journal advertisers claim to receive higher quality responses. They claim that those who read the publication are more interested and involved in their occupation; therefore, the respondent normally will be better qualified, interested, and experienced in his or her industry.

Finally, advertising in a trade or professional journal enhances the company's image. If the publication is considered prestigious by the target audience, then the publication's advertisers might experience that prestige as well. In addition, material surrounding the advertisement may cause an even greater impact upon the reader.

The lead time required for journals is a major disadvantage. In many cases, the lead time is prohibitive when recruitment needs are immediate. Due to the long lead time, response flow will not begin for several weeks.
However, journal advertisements are highly effective for long-term, on-going recruitment campaigns.

The paper used for journals is of much better quality than that used by newspapers. The printing technique also is unrivaled by that used for newspapers. Journals offer the opportunity to add color to the ad. As a result, the same ad used in both mediums will have a greater impact in the journal than in the newspaper.

Journal advertising typically provides nationwide exposure; consequently, this medium should be used only when the company expects that the prospective candidate will relocate. Moreover, the company should expect to cover relocation expenses.

The differences between journal advertising and newspaper advertising are summed up by Frank Coss.

Journal advertising requires a somewhat different orientation than does the newspaper. Journals are the most sophisticated medium you can use in terms of advertising techniques; they force you to plan ahead because of the lead time factor involved; and their pages contain your most knowledgeable competition. 22

Classified, Classified Display, and Display Advertisements

Advertisements are of three basic types: classified, classified display, and display. Any one or all three might appear in a newspaper or journal.

22 F. Coss, op. cit., p. 67.
Classified advertisements are the most commonly used original form of recruitment advertising (see Appendix A). They are generally found only in the classified ad section of a newspaper or journal. They are arranged alphabetically by the first word of the ad and grouped together by occupation, industry or field to which they are directed. The size of the ad varies; however, the ad does not contain illustrations or company logos. Typeface for all classified ads is the same throughout each medium's classified ad section. Classified ads are typeset by the publication free of charge. These ads have a high success rate for generating responses in any job category.

Classified display advertisements are typically found in the classified ad section; however, these might also be found in other sections of a publication (see Appendix A). This is the type of ad generally found in the sports, business, or finance sections as well as the classified section. In Deutsch, Shea & Evans' recruitment advertising guidelines, classified displays are explained.

These ads are usually defined as recruiting ads which make use of the publication's type faces other than the classified face and incorporate art elements such as borders and the company logo. This graphic treatment, which enables the ads to stand out better on the page, is a primary reason for their use.23

Classified displays are not listed alphabetically, but similar occupations, fields, or industries might be loosely grouped together. These ads are generally used for certain types of jobs, but as Hall Acuff explains, "There is also a theory that classified display ads are more appropriate for professional and managerial jobs, but little proof of this has been published."\footnote{Acuff, op. cit., p. 546.} As with classified ads, classified displays are typeset by the publication free of charge. The advertisers must, however, layout the ad indicating the desired typeface, ad size, borders, and logos.

Display advertisements allow more creativity (see Appendix A). These ads are found anywhere in a newspaper or journal. The size and design of display ads will vary. Illustrations are allowed many times with color, artwork, and photographs. These ads can utilize any kind of typeface whether the publication uses it or not. Robert LoPresto recommends using display ads in one or more industry, trade, or professional journals when recruiting salespeople, executives, or technical and professional people.\footnote{LoPresto, op. cit., p. 12-10.}

Deutsch, Shea & Evans provide two principal reasons for using display ads for recruitment purposes.

1. since they are not pubset, but carefully created within the agency and prepared in the form of a
Because display ads are more complicated, it is recommended that the services of an advertising agency be engaged to help prepare the ad. These ads generally take more time to create, lengthening the necessary lead time. They are not only more complicated but also more expensive. However, many of the expenses are one-time costs and the advertisement can be used more than once.

Geographic Areas in Which to Advertise for Software Engineers

When selecting a publication for advertisements, the advertiser must consider the audience exposed to the publication. Some publications have nationwide distribution and others limit circulation to specific geographic regions. For software engineering recruitment, publications should be selected that circulate in areas with a concentration of that talent.

Approximately 60,000 engineers graduate in the United States every year. About 6 percent of all

26F. Coss and M. Freedland (eds.), op. cit. p. 20.
undergraduate degrees are in engineering. Where do these engineers go after college? It is the recruiter's job to find them. In *Silicon Valley Fever*, Everett Rogers and Judith Larsen said, "Engineers and managers usually comprise 20 percent of the total workforce in a high-technology firm, the rest are clerical and skilled manual workers." It follows that a recruiter would likely find a concentration of engineers where there is a concentration of high-technology companies.

Rogers and Larsen suggest twelve areas across the United States that have heavy concentrations of high-technology companies. Most of these high-technology complexes are connected with a major research university which produces engineers. For example, Silicon Valley is located near Stanford University; Route 128 is near Massachusetts Institute of Technology; and Silicon Prairie is located near the University of Texas at Austin.

These high-technology centers produce copious amounts of software engineers. The two major producers of high-technology job fairs sponsor events in all but two of

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28Ibid., p. 235.

29Ibid., pp. 235-249.
TABLE 2
CONCENTRATIONS OF HIGH TECHNOLOGY COMPANIES

<table>
<thead>
<tr>
<th>High-Technology Complex</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silicon Valley</td>
<td>Santa Clara County, California</td>
</tr>
<tr>
<td>Route 128</td>
<td>Boston, Massachusetts</td>
</tr>
<tr>
<td>Bionic Valley</td>
<td>Salt Lake City, Utah</td>
</tr>
<tr>
<td>Silicon Valley East</td>
<td>Troy-Albany-Schenectady, New York</td>
</tr>
<tr>
<td>Silicon Prairie</td>
<td>Dallas-Fort Worth-Austin, Texas</td>
</tr>
<tr>
<td>Silicon Mountain</td>
<td>Colorado Springs, Colorado</td>
</tr>
<tr>
<td>Silicon Valley North</td>
<td>Portland, Oregon</td>
</tr>
<tr>
<td>Silicon Desert</td>
<td>Phoenix, Arizona</td>
</tr>
<tr>
<td>Minneapolis-St. Paul</td>
<td>Minneapolis-St. Paul, Minnesota</td>
</tr>
<tr>
<td>Seattle</td>
<td>Seattle, Washington</td>
</tr>
<tr>
<td>Orange County</td>
<td>Orange County, California</td>
</tr>
<tr>
<td>Research Triangle</td>
<td>Raleigh-Durham-Chapel Hill, North Carolina</td>
</tr>
</tbody>
</table>

these centers. The abundance of high quality engineers makes these areas attractive, cost effective markets within which hiring managers and employment representatives might recruit software engineers.

Software Engineers' Job Sources

Appropriate methods for recruitment advertising have been determined, but what sources do software engineers use during a job search? In order of preference, the choices rank as follows.30

1. business associates, friends, and personal networks
2. newspapers
3. technical and professional journals
4. employment/search agencies

The higher a person's position, the more important personal contacts are regarded. Many job seekers consider this as the only source of job opportunity. Newspapers are considered the second best source with technical and professional journals a distant third.

Engineers read newspaper advertisements regardless of where the ad is placed as long as it is gathered in an employment-oriented area of the section. In addition, readers will examine several possible categories for job listings. They understand that the ads are listed according to the advertiser's wording. Engineers' attitudes about the type of ads read are not as generous. Respondents to a 1983 survey illustrate these attitudes.

Some think that "their kind of job"—usually up-scale—would not be advertised in the classified section.

Others, on the other hand, feel that "their kind of job" is most likely to be advertised in the classifieds, and consequently do not look at the display ads.

A few respondents avoid the classifieds, or at any rate do not read the smallest ads in those pages, because they do not "want to bother with" the small print, and it's "hard to read tiny ads."31

31 Ibid., p. 51.
Software Engineers' Recommendations for Advertisement Content

What does a software engineer want to see in an ad? What does a software engineer consider important recruitment advertisement content? They want all the information possible, but they want it concisely. They want details and specifics about the job, the company, and everything that goes with it. The ad size is not important as long as it is not a tiny advertisement. The issues engineers want to read about are the issues they determined are most important about a job. With this information, engineers feel that they can decide if the job is right for them. They list eleven items that are crucial to recruitment advertisements. The items are listed in order of importance and are discussed in detail.32

1. a clear and full, though brief, description of the job
2. full statement of required qualifications and experience
3. clear statement of the opportunities for advancement
4. a statement of, or a clue to the salary
5. the technology (soft and hardware) with which or on which the company is working
6. statement of "where the company is going" (its "technological vision")
7. name of the company
8. other pertinent facts about the company
9. benefits
10. location
11. descriptive adjectives describing the job and the firm

32Ibid., pp. 69-77.
The most important item the software engineer looks for in an advertisement is the job itself. The job title will not be enough because different companies use the same title to describe different positions. What they do want is as complete a description as possible, but they want the description to be brief. What are the managerial responsibilities? What is the overall program that this job will be a part of? What equipment, processes, and languages are used? The engineer also wants to know the qualifications for this job. What education level does the recruiter seek? What skills and experience has the company deemed necessary for successful performance of the job? Which qualifications are required and which are desired?

Software engineers want to know if they will have opportunities for advancement within the company. They look for clues that management has thought through the position and the individual they are seeking. The engineer wants to know how and why the growth opportunities exist. Is the company growing and the engineer can grow with the company or is the company large allowing the engineer to slowly move up through the ranks?

Knowing the salary range helps readers screen advertisements. A stronger preference exists to know the salary level than to waste time responding to ads for positions outside the desired salary level. Engineers even
prefer knowing that the salary is open or negotiable than to know nothing.

For software engineers, knowing the technology a company uses goes beyond a desire to work with particular equipment or languages. They want to know the specific equipment available. It is too general to say that the company is "state of the art."

[Technology] seems to be very important to computer professionals (which includes the engineers in the field). It is a concern apparently unique to them, and is at least in part a function of the peculiarity of their field which, more than any other today, is in a state of radical perpetual evolution. Given those conditions, workers in the field have to make guesses as to the next likely technological developments and make their career choices accordingly. They also need to make educated guesses, to a certain extent, about the direction in which the field is going and about which of the new "toys" will dominate the field—at least for the next few years. These people can ill afford to stand still and continue working with old or obsolete machines or languages; this would limit their marketability, their professional mobility.33

For some engineers, knowing the company's name is the most important element of an advertisement. The more experienced engineer will know about other companies within the same field. Some engineers already know for whom they would or would not work. This is often the fact that answers the greatest number of questions for the reader. From the company name, the experienced engineer can determine what the company does, where the company is

33Ibid., p. 73.
located, and the level of technology employed by the company. Engineers typically will not respond to advertisements that do not include the company name. If the company is not well known, then the reader will want more information about the company itself. For instance, they will want to know the company size, its standing in the industry, the company's age, and organizational formality.

Engineers will look for information on the benefits package offered by the company. It is expected that the package includes the basic benefits; therefore, a statement about the fullness or generosity of the package proves sufficient. However, if some of the key benefits are not offered, a candidate may decide to go with another company. Any unusual benefit would be of greater interest and should be highlighted in the advertisement. Not mentioning benefits tends to leave the impression that the company is not people oriented. The manner in which a company regards its employees is an important issue for engineers as the next section describes.

Company location has become even more important since the 1974 oil crisis. Increasing traffic congestion has also made this a critical issue. People do not want to commute long distances. How accessible is the company from public or private transportation? Is relocation an issue?
Many companies recognize the bias against their location and address that issue in the advertisement. Control Data Corporation, Honeywell, FMC, Speery, and 3M have offices in Minnesota. They are aware that the Silicon Valley and Route 128 are well-known areas amongst high-technology engineers; however, Minnesota's high-technology reputation is not as prominent. This group of companies jointly produces advertisements stressing Minnesota's high-technology job opportunities and Minnesota's high-quality lifestyle. McDonnell Douglas Astronautics Company, located in Orange County, California, wanted to attract engineers who commute into Los Angeles. They produce a series of advertisements that stress the commute. Examples of ad titles for this company illustrate the concept: "Drive Time," "Love It or Leave It," "Commuting Is an Unnatural Act," "Want to See More of Your Home?" A final example is IOMEGA's advertisements. IOMEGA is located in Ogden, Utah. They have discovered that some engineers believe that moving to Ogden is comparable to moving to Siberia. Their ads always poke fun at their location. The ads also address the negative aspects of the area in which the target audience currently lives and turns them into positive aspects for Ogden. For example, the high cost of living and the commute

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34M. Magnus, "Recruitment Ad Vantages," op. cit., pp. 62-64.
in the Silicon Valley are targeted. Again, one ad's title illustrates the concept: "24 things to do in Ogden, Utah (besides work for IOMEGA)."^35

Adjectives describing the job and the company help the engineer get a feel for the company environment. Words and phrases like challenging, innovative, stimulating, fast growing, and progressive are important.

These items will not guarantee advertisement response quality; however, including them should increase the number of responses. Since addressing the advertisement toward your target audience is important, the content desires of software engineers cannot be ignored. It is important to know that the following will most commonly cause readers to stop and read an advertisement: job title; company name; salary; familiar system, equipment, function, skill; and size and layout of the ad.\(^{36}\) From this knowledge an advertiser can write an advertisement that will generate responses.

**Issues Deemed Important by Software Engineers**

What does a software engineer consider important about a job? Technical professionals ranked challenging


[^36]: B. Eckstein, op. cit., p. 81.
responsibilities and a stimulating work environment as the number one issue. Motivating factors are "the nature of the work, their role in the company, and the company's assistance in shaping their careers." 37 A 1987 survey conducted by *Electronic Engineering Times* resulted in the following six reasons why engineers change jobs. 38

1. more challenge
2. more money
3. advancement
4. security
5. professional development
6. better geographic location

In a 1983 study by the National Advertising Bureau, Inc., the following twelve issues were ranked by a group of engineers and computer professionals. The issues are listed in order of importance and are discussed in detail. 39

1. Challenging, stimulating, diversified work.
2. Opportunities for advancement/rapid advancement.
3. A degree of autonomy.
4. Pleasant, attractive work setting and co-workers.
5. Good, reasonable salary.
6. Appreciation, acknowledgment and recognition from management.
8. Location (convenience, distance, safety, parking).
9. Time--flexibility, informal "comp" time.
10. Educational opportunities--tuition reimbursement, in-house courses.


11. Producing product or service with integrity; an honest, socially useful product or service.

The actual work performed is ranked as the number one most important issue about an engineer's job. Engineers desire challenging, stimulating work that entails variety and diversity. They want opportunities to expand their knowledge and experiences. Yet, they also want a certain amount of autonomy in order to incorporate some of their own knowledge and creativity into the work.

Opportunities for advancement are deemed important because of the significance attached to recognition for a job well done. In addition, it signifies to peers, to the outside world, and to the worker that he is a valued, well-respected employee. Advancement also represents increased job responsibility and complexity.

Pleasant work environment includes some degree of office privacy, pleasant surroundings, informal office atmosphere, friendly colleagues, and flexible work rules. The only notable exception is further expectations in the Silicon Valley and a few other locations. Silicon Valley includes on-premise swimming pools, tennis courts, and entire sports complexes; however, company-paid sports club memberships will be accepted as a viable substitute.
Salary ranks a surprising fifth. The study indicates that most employees expect to receive an acceptable salary; otherwise, a new job would not be accepted. They do, however, prefer a higher salary to a lower one. Engineers recognize that there are trade-offs to a higher salary, but were unable to place a price on trade-offs.

Fringe benefits have become an expected part of any job. Engineers consider management style and philosophy more important than benefits. However, engineers believe that the fullness and generosity of the benefits package reveals management's philosophy toward their employees. Engineers use the package as a measure of management's people orientation. Are employees considered tools with which to achieve company goals or are they regarded as individual human beings? Educational opportunities stand out as the most important benefit offered by a company. Through this opportunity, employees can remain current in their field as well as expand their horizons. Profit sharing and stock options are mentioned as important, but only by a few respondents. In attempts to determine benefit preferences, a typical assumption is that preferences can be divided into demographic differences. However, study
results tend to provide preference trends characteristic of all employees.\textsuperscript{40}

Location addresses proximity to the home and a safe, pleasant neighborhood in which the firm is located. Employees also prefer parking provisions made by the company. The parking issue is particularly important to engineers working in a city. Other elements of the location issue include presence of higher educational facilities, similar industries, adequate housing, quality schools for children, and availability of recreational activities.

As professional employees, engineers do not earn overtime. Consequently, flexible time is an important issue. The engineers prefer flexibility in the time spent at work. Acceptable to them are informal compensatory time policies as well as self-regulation of lunch hours and arrival times.

Most frequently mentioned among products not considered socially useful are war-related products. Some engineers make a distinction between passive defense systems and aggressive weapons.

In a 1987 survey, engineers ranked layoffs as the number one item hitting them the hardest in 1986. Job

market and job security was ranked fourth among their top ten career concerns. Especially in a volatile market like that of the Silicon Valley, stability becomes a major issue.41

The sample of engineers for the Newspaper Advertising Bureau study represents six areas of the United States. These areas include Houston, Texas; Atlanta, Georgia; San Jose, California and surrounding areas; Chicago, Illinois and surrounding areas; Philadelphia, Pennsylvania; and New York, New York and surrounding areas.42

Relocation is the only issue that reflects geographic differences in engineers' preferences. However, relocation is not one of the twelve most important issues of a job. The top three draws that would entice an engineer to relocate are a substantial increase in salary, advancement in position/rank/title, and some resolution of the problems associated with the cost of housing differences. The salary increase should be enough to mitigate all increased expenses as a result of the new location. Advancement should include not only the new position but also any future positions. The opportunities must be deemed more available at the new

42B. Eckstein, op. cit., p. 5.
location. Resolution of the house problem involves the company's guarantee that a sale of the current residence and a purchase of the new residence will not result in a net loss for the engineer. This is especially critical for an employee moving from an area with a lower cost of living than the newer area. The employee also expects to purchase housing comparable to or better than what is left behind.43

Currently, a critical need exists for software engineers in Boston, Massachusetts and in California. However, the difficulty arises when a company in either Boston or California wants to hire a software engineer from another area. Housing costs and the cost of living are so high in these regions that moving into either area becomes prohibitive, particularly for the more senior engineer with a family and a home. The junior level software engineers, who tend to be single, can move into these areas more easily. They generally do not have mortgaged property.44

Another issue resulting from relocation possibilities concerns further opportunities available in the new location. If the software engineer accepts a position and relocates, then will other opportunities be

43Ibid., p. 33.

available if the original position does not work? Robert Wolfson, software electronics specialist at Management Recruiters in San Francisco explains.

It's very tough . . . to place software engineers in Texas or Florida. It's even tougher . . . to get them to go to Colorado or the Midwest . . . . Who wants to go there? There are no opportunities there. You may have one opportunity there, but if you take the job and it doesn't pan out, where do you turn? You've got a mortgage on your house, and the nearest other software company might be 1,000 miles away. 45

Knowing what motivates the desirable candidate can lead to a better advertisement. Research is important. Discover the benefits and rewards software engineers seek. Determine the work environment, career opportunities, and level of job satisfaction that will tend to attract the candidate desired. Once this knowledge is gathered, it can be incorporated into the advertisement.

CHAPTER III

METHODOLOGY

Survey Within Regional Divisions of the United States

In an effort to survey the United States, the country was divided into relevant regions to represent the country as a whole. The regions were based on areas where there exists a concentration of software engineers. These areas of concentration were established in Chapter II "Geographic Areas in Which to Advertise for Software Engineers."

At least one newspaper was surveyed for each of the twelve regions as well as newspapers known for their national circulation. In addition, trade and professional journals were surveyed for software engineering recruitment advertisements. In total, 124 software engineering recruitment advertisements were collected. Table 3 lists the publications surveyed.

Sunday editions of newspapers were surveyed since that edition most commonly carries the heaviest concentration of recruitment advertising. The Wall Street Journal is the only exception. Their heaviest advertising day falls on Tuesday; consequently, the Tuesday edition was surveyed.

40
### TABLE 3
**PUBLICATIONS SURVEYED**

<table>
<thead>
<tr>
<th>Publication Name</th>
<th>Type of Publication</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Orlando Sentinel</td>
<td>newspaper</td>
</tr>
<tr>
<td>The Boston Sunday Globe</td>
<td>newspaper</td>
</tr>
<tr>
<td>San Jose Mercury News</td>
<td>newspaper</td>
</tr>
<tr>
<td>National Business Employment Weekly</td>
<td>newspaper</td>
</tr>
<tr>
<td>New Haven Register</td>
<td>newspaper</td>
</tr>
<tr>
<td>Los Angeles Times</td>
<td>newspaper</td>
</tr>
<tr>
<td>San Francisco Examiner &amp; Chronicle</td>
<td>newspaper</td>
</tr>
<tr>
<td>Times Tribune*</td>
<td>newspaper</td>
</tr>
<tr>
<td>Wall Street Journal*</td>
<td>newspaper</td>
</tr>
<tr>
<td>New York Times</td>
<td>newspaper</td>
</tr>
<tr>
<td>The Seattle Times/Seattle Post-Intelligencer*</td>
<td>newspaper</td>
</tr>
<tr>
<td>Chicago Tribune</td>
<td>newspaper</td>
</tr>
<tr>
<td>Star Tribune</td>
<td>newspaper</td>
</tr>
<tr>
<td>The Philadelphia Inquirer</td>
<td>newspaper</td>
</tr>
<tr>
<td>Washington Post</td>
<td>newspaper</td>
</tr>
<tr>
<td>The Sunday Oregonian</td>
<td>newspaper</td>
</tr>
<tr>
<td>Dallas Times Herald</td>
<td>newspaper</td>
</tr>
<tr>
<td>Charlotte Observer*</td>
<td>newspaper</td>
</tr>
<tr>
<td>Houston Chronicle*</td>
<td>newspaper</td>
</tr>
<tr>
<td>The Sunday Denver Post</td>
<td>newspaper</td>
</tr>
<tr>
<td>Arizona Republic*</td>
<td>newspaper</td>
</tr>
<tr>
<td>Austin American-Statesman</td>
<td>newspaper</td>
</tr>
<tr>
<td>The Salt Lake Tribune*</td>
<td>newspaper</td>
</tr>
<tr>
<td>High Technology Careers</td>
<td>journal</td>
</tr>
<tr>
<td>Professional Careers</td>
<td>journal</td>
</tr>
<tr>
<td>Electronic Engineering Times</td>
<td>journal</td>
</tr>
<tr>
<td>Defense Electronics</td>
<td>journal</td>
</tr>
<tr>
<td>Defense Science Electronics</td>
<td>journal</td>
</tr>
<tr>
<td>Electronic Engineering Times/Salary and Opinion Survey</td>
<td>journal</td>
</tr>
<tr>
<td>IEEE Spectrum</td>
<td>journal</td>
</tr>
<tr>
<td>Experienced Engineer</td>
<td>journal</td>
</tr>
</tbody>
</table>

* no software engineer advertisements were found in this publication
All sections of the newspaper were surveyed. However, it was interesting to note that advertisements for this survey were found only in the classified section and occasionally in special career sections. Journal advertisements were found throughout the publication. Typically, there were no special sections in the journal for advertising.

Issues Important to Software Engineers

The Newspaper Advertising Bureau, Inc. conducted an extensive survey of engineers and computer professionals to determine the issues they deem important in relation to their job.¹ The respondents represented individuals from different regions of the United States. The relevant results from that survey were presented in Chapter II "Software Engineers' Recommendations for Advertisement Content" and "Issues Deemed Important by Software Engineers."

The next question became, "Do advertisers and software engineers agree on which issues are deemed important to the engineer?" In an attempt to answer the question, software engineering recruiters and recruitment advertising agency representatives were contacted. Each person was asked the following questions.

1. What is your name?
2. What is your job title?
3. What is the name of the company for which you work?
4. Where is your office located?
5. Have you ever been involved in a search for software engineers?
6. Have you ever been involved in a nationwide search for software engineers?
7. Have you ever advertised for software engineers nationwide?
8. Have you ever changed an advertisement because the advertisement would be directed toward software engineers living in an area of the United States other than where the job was located?
9. If there was a change, describe the change.
10. Where was the job located?
11. Where was the advertisement directed?
12. Do you feel the change helped in the responses received from the advertisement?
13. How did the change help?
14. Have you ever considered changing an advertisement in any other way?
15. What was the change?
16. Have you ever rejected the idea of changing an advertisement that would appear in an area of the United States other than where the job was located?
17. Why?
18. In order of priority, what do you think are the top five most important components of an advertisement from a software engineer's viewpoint?
19. If presented with the idea of regionalizing recruitment advertisements for software engineers, would you say it should be done?
20. Why or why not?
21. Is there anything else you would like to say?

Each conversation was conducted over the telephone to maintain consistency in the manner of questioning and recording responses. Appendix B contains a complete list of respondent names, job titles, company names, and office locations.

All conversations were preceded by the following statement as an introduction.
My name is Christine Thomas. I am a graduate student at California State University, Hayward. I am currently working on a thesis in partial fulfillment of a Master's degree in Business Administration. My thesis is a study of the need to regionalize recruitment advertisements. Specifically, I am studying nationwide recruitment advertising for software engineers. I would like to ask you some questions regarding your views on nationwide efforts to recruit software engineers through newspaper and technical and professional journal advertisements.

There were several ways in which respondents were selected. Some were contacted because of their known involvement in nationwide recruitment efforts of software engineers. Others were contacted after a previous respondent had recommended the individual. A third method of discovering respondents resulted from names and telephone numbers offered in actual software recruitment advertisements.

In total, twenty-two individuals were contacted. Six people declined participation in the survey. Of those that did respond, twelve were employed by a specific company to recruit employees, two worked for advertising agencies that handled recruitment advertisements, one was the owner of a search firm, and one was a retired human resources vice president.

The first three questions of the survey established the respondent's involvement with software engineering recruitment. The results of those questions are provided at
TABLE 4
SURVEY RESPONDENTS' INVOLVEMENT WITH SOFTWARE ENGINEER RECRUITMENT

<table>
<thead>
<tr>
<th>The Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have you ever been involved in a search for software engineers?</td>
<td>15</td>
<td>1</td>
</tr>
<tr>
<td>Have you ever searched for software engineers nationwide?</td>
<td>13</td>
<td>3</td>
</tr>
<tr>
<td>Have you ever advertised for software engineers nationwide?</td>
<td>13</td>
<td>3</td>
</tr>
</tbody>
</table>

this time. The remaining survey results are presented in Chapter IV.

Two respondents who have searched for software engineers have never conducted a nationwide recruitment effort. Both people operate in California's Silicon Valley and feel that there are enough software engineers locally from which to recruit. That strategy minimizes any relocation expenses as well as recruiter travel expense to meet for interviews.

Examination and Evaluation of Software Engineer Recruitment Advertisements

Each designated newspaper and journal was surveyed for recruitment advertisements searching for software engineers. For newspapers, only Sunday editions were
searched except for The Wall Street Journal. As explained at the beginning of Chapter III, recruitment advertising is heaviest in Sunday editions; however, Tuesday is the heavy recruitment edition for The Wall Street Journal. All pages of designated publications were surveyed for appropriate advertisements.

Only those advertisements which specifically mention software engineers were selected. The only deviation from the title "Software Engineer" that was allowed concerned some indication of the level of experience possessed by a candidate. For example, advertisements were accepted for "Senior Software Engineers." Those rejected included "Software Design Engineers" and "Software Engineer Managers" because this enters a realm of positions that is either more specific in scope or involves management duties beyond that performed by a typical software engineer. Appendix C gives several examples of advertisements selected for examination and evaluation.

All advertisements were examined and evaluated against the same criteria. Those criteria were selected based on information set forth in Chapter II. Specifically, the recommendations made by engineers for advertising content were used as criteria. Appendix D provides a sample of the form used to examine and evaluate each advertisement.
Once all advertisements were evaluated, results were tabulated. Statistics were calculated for all 124 advertisements as a whole. In addition, statistics were calculated separately for magazines and journals. The results are presented in Chapter IV.
CHAPTER IV

PRESENTATION AND ANALYSIS OF THE RESULTS

Issues Important to Software Engineers as Viewed by Advertisement Writers

Chapter II presented a list of issues deemed important to a software engineer in relation to their job. In addition, a list of recommendations from software engineers regarding advertising content was presented. The recommendations stem from the issues software engineers consider important.

Sixteen writers of software engineer recruitment advertisements were asked the question, "What do you think are the top five most important components of an advertisement from a software engineer's viewpoint, in order of their priority?" The following table compares the results of that survey question to what software engineers recommend for advertisement content as well as the issues they consider important enough for changing their job. The advertisers' responses are listed by the number of times each issue was ranked first, second, third, fourth, or fifth.

Each issue ranked by software engineers is explained in Chapter II. However, the advertiser survey
<table>
<thead>
<tr>
<th>Important Issues for Job Change and Recommended Advertisement Content</th>
<th>Rank by Software Engineers</th>
<th>Number of Times Ranked by Advertisers in Each Position</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ad Content</td>
<td>Job Change</td>
</tr>
<tr>
<td>job content</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>experience required</td>
<td>2</td>
<td>--</td>
</tr>
<tr>
<td>growth opportunities</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>salary</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>technology</td>
<td>5</td>
<td>--</td>
</tr>
<tr>
<td>company's vision</td>
<td>6</td>
<td>--</td>
</tr>
<tr>
<td>company name</td>
<td>7</td>
<td>--</td>
</tr>
<tr>
<td>other company facts</td>
<td>8</td>
<td>--</td>
</tr>
<tr>
<td>benefits</td>
<td>9</td>
<td>7</td>
</tr>
<tr>
<td>location</td>
<td>10</td>
<td>8</td>
</tr>
<tr>
<td>adjectives</td>
<td>11</td>
<td>4</td>
</tr>
<tr>
<td>autonomy</td>
<td>--</td>
<td>3</td>
</tr>
<tr>
<td>total compensation</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>ad size</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>response directions</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>industry</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>management quality</td>
<td>--</td>
<td>6</td>
</tr>
<tr>
<td>engineer's interest</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>job security</td>
<td>--</td>
<td>12</td>
</tr>
</tbody>
</table>
TABLE 5  
(continued)

<table>
<thead>
<tr>
<th>Important Issues for Job Change and Recommended Advertisement Content</th>
<th>Rank by Software Engineers</th>
<th>Number of Times Ranked by Advertisers in Each Position</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ad Content</td>
<td>1</td>
</tr>
<tr>
<td>engineer visibility</td>
<td>--</td>
<td>0</td>
</tr>
<tr>
<td>ad graphics</td>
<td>--</td>
<td>1</td>
</tr>
<tr>
<td>further education</td>
<td>--</td>
<td>0</td>
</tr>
<tr>
<td>flexible time</td>
<td>--</td>
<td>0</td>
</tr>
<tr>
<td>product's integrity</td>
<td>--</td>
<td>0</td>
</tr>
</tbody>
</table>

raised several other issues which should be explained. Total compensation represents all salary and benefits. Ad size refers to making an advertisement large enough to be seen and read. Response directions refers to an easy-to-follow method for notifying the company of interest. The industry is the overall work of the company; for example, does the company manufacture semiconductor chips or produce defensive weapons systems? Engineer's interest relates to the reader's interest in the job being advertised. Engineer visibility is the level of exposure to management and colleagues the engineer will be subject to in the job. Ad graphics are not only the pictures used in display ads, but includes the amount of white space in the ad and the size of lettering.
Table 6 ranks the advertisers' responses by total number of times the issue was mentioned as one of the top five most important components of an ad from the software engineer's viewpoint. In the case of a tie, the issue with the greatest number of higher ratings is given the higher ranking. For example, salary and technology are both mentioned seven times. Technology is ranked in the first place to third place range six times; whereas, salary is not mentioned as a first to third place item once. Technology has the greater number of higher ratings; consequently, technology is ranked fourth and salary receives the fifth place ranking.

Examination of Tables 5 and 6 will help determine how closely software engineers' and advertisers' thinking parallel each other. Are advertisers writing into the advertisements those issues that software engineers want to read? Are advertisers highlighting the issues that will entice software engineers to consider a job change?

Job content ranks first in software engineers' recommended advertisement content and important job changing issues. Fifteen of sixteen advertisers ranked job content in the top five most important components of ads from a software engineer's viewpoint. It was ranked first by 56 percent of the respondents. This issue alone received the greatest volume of number one ratings as well
### TABLE 6
ADVERTISER RATINGS IN TOTAL TIMES ISSUE WAS MENTIONED

<table>
<thead>
<tr>
<th>Important Issues for Job Change and Recommended Advertisement Content</th>
<th>Rank by Software Engineers</th>
<th>Rank by Advertiser in Total Times Mentioned</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ad Content</td>
<td>Job Change</td>
</tr>
<tr>
<td>job content</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>experience required</td>
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<td>--</td>
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<tr>
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<td>technology</td>
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</tr>
<tr>
<td>company's vision</td>
<td>6</td>
<td>--</td>
</tr>
<tr>
<td>company name</td>
<td>7</td>
<td>--</td>
</tr>
<tr>
<td>other company facts</td>
<td>8</td>
<td>--</td>
</tr>
<tr>
<td>benefits</td>
<td>9</td>
<td>7</td>
</tr>
<tr>
<td>location</td>
<td>10</td>
<td>8</td>
</tr>
<tr>
<td>adjectives</td>
<td>11</td>
<td>4</td>
</tr>
<tr>
<td>autonomy</td>
<td>--</td>
<td>3</td>
</tr>
<tr>
<td>management quality</td>
<td>--</td>
<td>6</td>
</tr>
<tr>
<td>job security</td>
<td>--</td>
<td>12</td>
</tr>
<tr>
<td>further education</td>
<td>--</td>
<td>10</td>
</tr>
<tr>
<td>flexible time</td>
<td>--</td>
<td>9</td>
</tr>
<tr>
<td>product's integrity</td>
<td>--</td>
<td>11</td>
</tr>
</tbody>
</table>
as the greatest number of votes overall. So, there is a consensus that software engineers most want to read about the actual work performed.

Some disparity exists for the second most important issue to software engineers. After job content, software engineers most want to read about the experience required for the job; however, growth opportunities are second most important when considering a job change. Advertisers think that the job location is second most important to the software engineer. Location is ranked, by software engineers, tenth and eighth respectively for ad content and job change consideration. Even though the engineer wants to read about the required experience, this is not an issue taken into account for job change consideration. Only one advertiser mentioned experience as an important ad component. Growth opportunities were ranked second in importance for a job change and third in importance for ad content by the engineers. Advertisers also ranked this issue third most important. There is a general consensus that growth opportunities ranks third, but no consensus regarding the second most important issue.

Salary and technology rank fourth or fifth under all categories except important job change consideration. Fourth place for job change is adjectives describing the work environment. It is interesting to note that six
advertisers ranked salary as the fourth most important issue to software engineers. Only seven advertisers mentioned salary and the seventh response was for a fifth place rank. This is the largest concentration with the lowest range of ratings among all the issues. All respondents who mentioned salary said that actual dollar amounts should not be given, but that it should be mentioned that salary is competitive. The software engineer wants at least the salary range as a means of screening the advertisement and reducing wasted responses.

The sixth item recommended by software engineers for inclusion in an advertisement is the company's vision. They are looking for an indication of where the company is going. However, this issue is not even mentioned as an issue considered when making a job change. Sixth in that category is the quality of management. Advertisers believe that adjectives describing the job and work environment are sixth most important.

Company name is the seventh most desirable item in an ad, yet the benefits package ranks as the seventh most important job change factor. Advertisers regard company vision as the seventh most important issue from the software engineer's viewpoint.

Overall, the only issues over which there is some agreement are job content, growth opportunities, and
salary. However, an agreement does not exist concerning the degree of salary disclosure. The software engineers look for a salary range. The advertisers merely want to mention that salary is competitive.

The Actual Software Engineer
Advertisement Content

Recruitment advertisements for software engineers were collected and examined for content. Table 7 presents the results of that examination. Data were categorized by type of publication and then combined for overall percentages. In addition, advertisements were categorized by the three basic types described in Chapter II.

The examination of advertisements reveals that recruitment ads for software engineers in the newspaper tend to be classified display ads (see Appendix A) and display ads in journals (see Appendix A). Only 4 percent of newspaper ads are of the classified variety and no classified ads were found in the journals.

Journal ads tend to present an image of the company. A greater percentage of the time, journal ads gave information about growth opportunity within the company, the technology utilized by the company, the company's vision and direction, and other pertinent company facts. Journal ads described the geographic location of the company and the benefits of the area in more detail.
### Table 7

**Advertisement Content**

<table>
<thead>
<tr>
<th>Issue</th>
<th>Percentage of Time the Issue Is Addressed in an Ad Found in the Newspaper</th>
<th>Journal</th>
<th>Combined Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>percentage of total ads</td>
<td>59%</td>
<td>41%</td>
<td>100%</td>
</tr>
<tr>
<td>classified ads</td>
<td>4%</td>
<td>0%</td>
<td>2%</td>
</tr>
<tr>
<td>classified display ads</td>
<td>74%</td>
<td>33%</td>
<td>57%</td>
</tr>
<tr>
<td>display ads</td>
<td>22%</td>
<td>67%</td>
<td>40%</td>
</tr>
<tr>
<td>job content</td>
<td>58%</td>
<td>59%</td>
<td>58%</td>
</tr>
<tr>
<td>experience required</td>
<td>92%</td>
<td>63%</td>
<td>80%</td>
</tr>
<tr>
<td>growth opportunity</td>
<td>25%</td>
<td>47%</td>
<td>34%</td>
</tr>
<tr>
<td>salary</td>
<td>55%</td>
<td>49%</td>
<td>52%</td>
</tr>
<tr>
<td>technology</td>
<td>53%</td>
<td>88%</td>
<td>68%</td>
</tr>
<tr>
<td>company's vision</td>
<td>29%</td>
<td>76%</td>
<td>48%</td>
</tr>
<tr>
<td>company name</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>other company facts</td>
<td>52%</td>
<td>65%</td>
<td>57%</td>
</tr>
<tr>
<td>benefits</td>
<td>68%</td>
<td>57%</td>
<td>64%</td>
</tr>
<tr>
<td>location</td>
<td>34%</td>
<td>41%</td>
<td>37%</td>
</tr>
<tr>
<td>adjectives</td>
<td>64%</td>
<td>92%</td>
<td>76%</td>
</tr>
</tbody>
</table>
These advertisements also tended to use more descriptive adjectives describing the company, the job, and the environment. In contrast, newspaper advertisements tend to present more factual information. Newspaper ads more often state the required experience, salary, and benefits.

All ads examined revealed the company name. Software engineers do not generally respond to advertisements without a company name. They feel that the company name is the one piece of information that answers the most questions; however, they rank this seventh in information desired in an ad. Company name was not ranked for consideration when changing jobs. Advertisers gave this issue minimal ranking as important information to software engineers, yet this is the only piece of information that was included in all of the ads examined.

Job content, the only issue with agreement on its importance, was included in only 58 percent of all advertisements. Ninety-four percent of surveyed advertisers rated job content in the top five most important issues to a software engineer, yet only slightly more than half of the advertisements included this information. What was included more often was just the job title and a list of desired qualifications. Required experience was listed 92 percent of the time in newspaper ads and in 63 percent of journal ads. This was rated
second in desired ad content by software engineers, but only one advertiser mentioned it as important.

The software engineer's desire to have a salary range as a screening tool is not realized. Not one advertisement examined divulged a salary range. Typically, the phrase "competitive salary" was the only mention of the issue. In contrast, advertisers occasionally provided a description of the basic benefits package. An ad for Computervision provides a typical example of the reference to salary and benefits.

Computervision offers competitive salaries and a comprehensive benefits package including 401(k) option, stock purchase plan, medical/dental/life insurances, tuition reimbursement and much more.

Micro-Term, Inc. of St. Louis, Missouri said that they "offer a salary and package of perks that make a Midwest winter worthwhile." Salary rated number five by advertisers as an issue software engineers wanted to see in an ad and, overall, the word salary or the phrase "competitive salary" appeared in about half of the advertisements. Benefits received only one mention as an

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2MicroTerm, Inc. "We'll Pay the Fare If You Think on a Different Plane." Recruitment ad, Star Tribune, January 10, 1988.
issue software engineers wanted to see, yet it appeared in 64 percent of newspaper and journal ads. Most references to growth opportunity were from lesser known companies still in the start-up stage. The growth opportunity statement usually preceded bonus or stock option offers. One advertisement mentioned a high visibility factor associated with the job. Growth opportunity appeared only one-third of the time yet it rated second as a job change consideration and third for both software engineers and advertisers as looked for in an ad.

Technology received mention in 53 percent of newspaper ads and 88 percent of journal ads. This issue received advertisers' second highest number of votes as the most important component of an advertisement from the software engineers' viewpoint. Advertisers feel this is an important issue and they demonstrate that belief by including references to company technology in their recruitment ads. Software engineers rate technology as the fifth most important item they want to see in an advertisement.

Software engineers want to know the company's vision or direction; however, they are likely to read about it only in journal advertisements. Only 29 percent of newspaper ads include this information. This is not an issue that will cause software engineers to change jobs, but they do want to know about where the company is headed.
Other pertinent facts about the company ranged from information regarding the company's financial picture to an interesting pertinent fact provided by two different companies that is an indication of changing times. Bell & Howell Company of Torrance, California mentioned that a non-smoking candidate was preferred. Moreover, CIMPOINT of Austin, Texas indicated a non-smoking work environment. Other pertinent company facts were mentioned in 57 percent of the ads, yet advertisers did not believe this was something software engineers were looking for in the ads. The engineers, however, rate this as the eighth most desired item in an advertisement.

Advertisers use descriptive adjectives more frequently in journal ads than newspaper ads. In either case, adjectives are used often. For example, they described the job, the work environment, the technology, the responsibilities, and the geographic area. Software engineers want to read these adjectives since it helps develop a feel for the company and the job.

Location was an issue in the advertisements only 37 percent of the time; however, whenever location was


included in an ad, it was enhanced more than any other issue. Location more commonly appeared in journal ads than newspaper ads. This was rated eighth as a job change issue, tenth as desired ad content, and second as an issue advertisers believe software engineers want to read about. Examples of location enhancements include: proximity to a major city or university, pleasant living environment or climate, low cost of living or housing, and recreational attributes of the area. Sanders Associates, Inc. provides an example, followed by an example from an advertisement by The Boeing Company.

We're a Lockheed company headquartered in Nashua, New Hampshire--a progressive tax-free community recently rated the #1 Best Place To Live In the U.S. Additionally, our close proximity to Boston offers a wealth of cultural resources.5

We are located in the beautiful Puget Sound area of the Pacific Northwest. Near Seattle, the top-ranked recreation city in America.6

Current Regionalization of Software Engineer Recruitment Advertisements

As described in Chapter II, the survey of individuals involved in software engineer recruitment questioned the current trends in regionalization of


advertisements. Table 8 presents further results from the survey. Some of the question responses only total thirteen. Table 4 reveals that only three of the respondents have not been involved in nationwide software engineer recruitment efforts; as a result, their responses were only tabulated for the last question in Table 8.

**TABLE 8**

CURRENT REGIONALIZATION OF SOFTWARE ENGINEER ADVERTISEMENTS

<table>
<thead>
<tr>
<th>The Question</th>
<th>Yes</th>
<th>No</th>
<th>Unknown</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have you ever changed an advertisement because the advertisement would be directed toward software engineers living in an area of the United States other than where the job was located?</td>
<td>12</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Do you feel the change helped in the responses received from the advertisement?</td>
<td>8</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Have you ever considered changing an advertisement in any other way?</td>
<td>11</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Have you ever rejected the idea of changing an advertisement that would appear in an area of the United States other than where the job was located?</td>
<td>2</td>
<td>11</td>
<td>0</td>
</tr>
<tr>
<td>If presented with the idea of regionalizing recruitment advertisements for software engineers, do you think it should be done?</td>
<td>14</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>
If there was an affirmative response to the first question in Table 8, then the respondent was asked to describe the change, explain where the job was located, and the location of the geographic market in which the ad was placed. Advertisements were written, for example, to entice software engineers from Boston, Massachusetts to the Silicon Valley in California; from Chicago, Illinois to Ann Arbor, Michigan; from Minneapolis, Minnesota to Colorado Springs, Colorado; from Los Angeles, California to Washington, D.C.; and from the entire United States to Hatboro, Pennsylvania. Table 9 lists the alterations described and the number of times it was mentioned by different advertisers. Interestingly, all of the changes had to do with the location of the company except for salary and benefits.

The most common example given for weather was to wait for a blizzard on the east coast and then highlight the warm, sunny California weather. However, the east coast and mountain locations highlight the California smog. Most areas attack the high cost of living in California and Boston. These two areas have heavy concentrations of software engineers and both areas have high housing and cost of living problems. Describing the beautiful countryside and the available recreational activities is a tactic used by any type of location. Salary and benefits
TABLE 9
SOFTWARE ENGINEER RECRUITMENT ADVERTISING ENHANCEMENTS

<table>
<thead>
<tr>
<th>The Topic of the Alteration</th>
<th>The Number of Times Mentioned by Advertisers</th>
</tr>
</thead>
<tbody>
<tr>
<td>the weather</td>
<td>6</td>
</tr>
<tr>
<td>the cost of living</td>
<td>7</td>
</tr>
<tr>
<td>the salary</td>
<td>1</td>
</tr>
<tr>
<td>the benefits</td>
<td>1</td>
</tr>
<tr>
<td>the countryside</td>
<td>5</td>
</tr>
<tr>
<td>contrast one area vs another</td>
<td>5</td>
</tr>
<tr>
<td>educational facilities</td>
<td>1</td>
</tr>
<tr>
<td>topics to interest the spouse</td>
<td>1</td>
</tr>
<tr>
<td>housing</td>
<td>3</td>
</tr>
<tr>
<td>the commute</td>
<td>1</td>
</tr>
<tr>
<td>recreational attributes</td>
<td>1</td>
</tr>
<tr>
<td>smog</td>
<td>1</td>
</tr>
</tbody>
</table>

were mentioned by more metropolitan areas when targeting a rural marketplace. Recruiters in metropolitan areas felt they provided more in total compensation than rurally located companies.

Advertisers were asked if altering an advertisement to fit a specific geographic marketplace helped in the responses received. Three people said they did not know if the change helped and two said it did not help. Eight
advertisers said the change did help. The typical reply to how the change helped in the responses received was that it increased the number of responses. More important, when the issue was location, advertisers claim it increased the number of candidates serious about relocation. Kenneth Whelan, Personnel Manager at Acurex Corporation, said, "When relocation becomes the key factor in nationwide recruitment of software engineers, highlighting an issue helps identify why the engineer is looking for a new job. The candidate may be ready to move because of other factors, but the recruiter knows that the job change is a result of their wanting to move."  

Mark Wong, Vice President at Bernard Hodes Advertising, said, "By highlighting particular issues, the advertiser is pushing the right buttons for what the group or individual wants to hear."  

Hall Acuff, a retired human resources executive, said changing the ad for certain areas reduced the competition. Dean Sharp, Manager of Executive Recruitment at Sverdrup Corporation, said altering the ad breaks the plane of dull advertising. "It draws attention to what people are tired of." 

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7See Appendix B.  
8See Appendix B.  
9See Appendix B.  
10See Appendix B.
Advertisers were then asked to describe other ways they alter an advertisement for software engineers. Both respondents from advertising agencies said they have altered the response mechanism to make it easier for software engineers to contact the company. An interesting example from an ad for The MITRE Corporation is given.

If you have a personal computer or terminal with a telephone connection, explore MITRE's opportunities in Massachusetts on line by calling (617) 271-8000. Use the login name 'mitre' followed by a carriage return.11

This ad was run in the IEEE Spectrum, a national publication. Other advertisers might change the ad lead in, the graphics, the amount of white space in the ad, or the section of the newspaper in which the ad appears. Ed Zakrzewski, Manager of Employment/Training and Development at General Instrument, said he constantly changes ads, but he also indicated that he does not believe changing the ad improves the responses received. Bob Hungerford, Manager of Human Resources at Unisys, said:

Advertisements are too expensive to use as a job-listing service. The ad should be creative, original, distinctive. It should look unlike all of the other ads on the page. Whatever it takes to accomplish that. It should contain a sense of creativity, a professional challenge. Maybe the ad will involve a puzzle or a riddle which is solved while reading further.12


12 See Appendix B.
Advertisers were then asked if they had ever rejected the idea of changing an advertisement that would appear in an area of the United States other than where the job was located. The majority of responses was no; however, two people said that they had. David Thomas, Human Relations Manager at Maxim Technologies, Inc., said, "I have not rejected the idea of changing an advertisement, but I have rejected advertising in the Boston area in the summer. It is hard to get software engineers to move to California in the summer when the weather in Boston is nice." Ed Zakrzewski of General Instrument in Hatboro, Pennsylvania said:

Once I rejected highlighting our proximity to the Jersey shore. At the same time, the newspaper headlines were carrying stories about all the garbage washing up on the Jersey beaches. This was not an appropriate time to use these beaches as an enticement. I didn't want people to know we were anywhere near the Jersey shore.

Advertisers were asked their opinion on the need to regionalize software engineer recruitment advertising. Two said it should not be done and fourteen said it should be done. One reason for not regionalizing ads was given by Mark Wong of Bernard Hodes.

If you have done your homework upfront, then it is not necessary to regionalize the advertisement because

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13 See Appendix B.

14 See Appendix B.
you should already have an ideal candidate in mind. So, you should be advertising for the type of person desired and not where they are located.\(^{15}\)

Arguments for regionalization include a more successful use of money spent, a chance to appeal to specific groups of people, making people aware of opportunities available in other areas, and personalizing the ad. However, a caution was mentioned. David Thomas of Maxim Technologies, Inc. said it should only be used if clear differences in non-engineering aspects of the job can be defined (i.e., climate, cost of living). Kenneth Whelan of Acurex Corporation said, "You have to be creative, but you also have to know what will work in the marketplace."\(^{16}\)

Two final statements of interest were given when respondents were asked if there was anything else they would like to say on this topic. Barbara Shaw of Austin Knight Advertising provides the following reminder.

Software engineers will continue to be hard to recruit. They can name their own price and they know it.\(^{17}\)

Hall Acuff adds:

It must be remembered that [recruitment advertising regionalization] is not a panacea. Too many people do not want to relocate. This is not the only way to recruit.\(^{18}\)

\(^{15}\)See Appendix B.  \(^{16}\)See Appendix B.  
\(^{17}\)See Appendix B.  \(^{18}\)See Appendix B.
Conclusions

There is a consensus among those involved in the nationwide recruitment of software engineers that advertisements should be regionalized. A consensus also exists regarding the topic upon which regionalization should be based. The job location presents several issues of concern to software engineers. These differences do not occur along demographic lines, but they do vary along geographic lines.

Software engineers live or want to live in certain regions of the United States for different reasons. They also choose not to live in certain parts of the country. Some want to leave or will not move to California because of the high cost of living, the smog, the congestion, or the commute. Some want to live in or move to California for the sunny climate. Others do not want to live on the east coast because of the cold weather. Some like living in snow country because of the skiing. So, even within the same region the differences vary. The advertiser needs to determine why some software engineers are willing to
relocate from a particular area and what they are looking for in their geographic preference. Thus, those issues can be used in the advertisement to induce a response from software engineers.

Within the topic of job location, there are several related issues that a software engineer will consider when contemplating a job change. Any one of the issues can be highlighted in an advertisement. Traffic congestion, length of commute, and accessibility to private or public transportation might be used for or against a major metropolitan area. The area's high technology reputation, presence of similar industries, and accessibility to educational facilities can be used for any region of the country. However, this might be enhanced for a lesser known area than the world renowned region of Silicon Valley. Cost of housing, cost of living, the quality of the environment, the quality of housing available, quality of schools for children, and availability of recreational activities can be addressed for almost all regions. The cost of living and cost of housing, for example, can be used against Boston and some areas of California.

Software engineers might be paid a different salary from rural to urban areas. It is beyond the scope of this study to determine appropriate salary ranges for work performed; however, this topic does not seem to have
geographic preference trends. Software engineers believe that there are trade-offs to a high salary. Those trade-offs might include factors like air quality. Engineers expect the salary to be sufficient; otherwise, they would not consider the job change.

Benefits do not tend to vary among demographic categories. However, they can vary among groups of individuals. One benefit that seems to be particularly important to software engineers is educational assistance from the company. Whether training is offered through colleges and universities or through company sponsored programs, the engineer wants the opportunity to prevent obsolescence.

Advertisers consider location to be the second most important item to present in an advertisement from a software engineer's viewpoint and it is addressed 37 percent of the time overall. When mentioning the topics of enhancement, advertisers mentioned only location-related topics except for one mention of salary and one mention of benefits. The people involved with software engineer recruitment seem to understand the importance of the location issue when inducing potential candidates to different geographic regions within the United States.

Other job-related issues do not have a tendency to vary among demographic or geographic differences between
software engineers. They are issues that can be met within any area of the country. For example, job content, company name, or company vision will not reflect the area of the country in which the job is located.

Most advertisers who responded that regionalization of advertisements did help with the advertisement responses received indicated the help was in the form of an increased number of responses. This study does not attempt to determine any change in the quality of the response; however, if the number increases, then the recruiter does have a larger pool from which to make a selection.

Some advertisers responded that by changing the ad to enhance regional differences it improved the chances of receiving replies from those software engineers serious about relocation. The advertisement can be used to help educate the engineer about the area, thereby increasing the number of candidates willing to relocate. Conversely, the ad can be used to screen out those not willing to relocate to the region in question.

The survey of advertisers indicates that some regionalization of software engineer advertisements currently exists. The examination of advertisements corroborates the results of the survey. Enhancement of specific topics within recruitment advertising is taking place. Of the topics highlighted, location is not always
the most frequently mentioned topic; however, when mentioned, advertisers tend to be more descriptive about location than any other topic.

A comparison between what the engineers want to see and what they are being given by advertisers paints a different picture. There is complete agreement about job content being the most important issue. In addition, there is agreement about the level of importance for growth opportunities and salary. Location, however is not accorded the same agreement amongst the two parties. This leaves some question as to the effectiveness of a nationwide recruitment campaign. If software engineers have little willingness to relocate, then regionalizing advertisements will not contribute to a more effective recruitment effort. Moreover, conducting nationwide recruitment campaigns will probably prove to be a futile effort.

Recommendations

Since companies will continue to demand the labor performed by software engineers, companies will continue to replace and expand the supply of software engineers. Money spent on advertising might be better spent by researching the current available supply within the respective region.
Initial hiring expenses can be minimized if relocation expense can be minimized or eliminated.

It must be remembered that job content is the most important issue to software engineers. An examination of the job might point out possible improvements that would make it more attractive to potential candidates within the local area as well as to current employees. Perhaps by increasing the challenge, stimulation, or diversity of the work, interest in the job might increase. Hence, a new pool of candidates might be available, thereby reducing the scope of search efforts. Company turnover rates might also be reduced if engineers find less reason to desire a job change.

In the event a company decides to look at other geographic locations for software engineers, prior research would be of benefit. An effort to determine why potential candidates wish to leave an area will provide a list of topics upon which an advertisement can be based. The research might also discover that a change of location is not an issue for software engineers in that area. Even if location does prove to be an issue, the engineers might not see relocation as the solution. Therefore, a willingness to relocate might not exist. Advertising in that area might prove to be a waste of time and money.
Regionalization of recruitment advertising can be beneficial if used appropriately. It does not guarantee results and those results can be diminished if advertisements are written with no information about the target group of individuals or the marketplace. This is not the solution to recruitment efforts; however, it is one tool available for improving the return on dollars spent for software engineer recruitment advertising.
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APPENDIX A

THREE TYPES OF ADVERTISEMENTS
SR. SOFTWARE ENGINEER

Graduate eng. or equivalent with established career exp. in programming, real-time systems, and software development. Expert knowledge required to direct/coordinate total project.

Send resume to Personnel at Tandon Computer Corporation, 405 Science Drive, Moorpark, CA 93021. An equal opportunity employer.

Software Engineers

You'll thrive on the advanced technology and the rewards at Tandon, a fast-growing company creating innovative products for the personal computer industry. Currently, we have opportunities for Software Engineers to join us in an environment where creativity and high standards are rewarded by visibility and advanced responsibility.

In these positions, you will join a small group of Software Engineers focused on the development of system software. This includes work with BIOS, diagnostics and operating systems for new PC products based on Intel 8080 series and proprietary subsystems. The positions require BSCS or equivalent (MS desirable), with 3-5 years experience in assembly language and C. You must have a detailed knowledge of PC-AT and MS DOS systems, as well as successful experience developing commercial products (preferably based on PC-XTIAT products).

In addition to a forward-thinking environment, Tandon offers a competitive compensation package. For immediate consideration, please send your resume to Diane Schlageter, Tandon Computer Corporation, 405 Science Drive, Moorpark, CA 93021. An equal opportunity employer.
The most demanding partner an engineer can have is a dynamic and innovative company. If you're challenged by the scope and complexity of real-world issues, and stimulated by interaction with other innovative thinkers, Northrop DSO offers you the opportunity to go one-on-one with some of the industry's most challenging applications. Combining scientific creativity with innovative project teams, Northrop offers professionals with a BSCS, BSEE, BS Math or Physics (or equivalent) MS preferred, and a minimum of 3 years experience, opportunities in the following areas.

**ANTENNA DESIGN ENGINEERS**

Experience related to analysis, design, development and testing of automatic ECM/IEW antennas, knowledge of phased arrays, monopulse DF systems and millimeter wave techniques required.

**SOFTWARE ENGINEERS**

Experience required expertise in any/all of the following:

- **Software Systems:** Software requirements analysis, architecture design, software validation and performance specification modeling, and interface design specification.
- **Systems Programmmer:** Structured software design languages including Ada, Assembly, C, & Java languages and Pascal operating systems.
- **ECM/IEW Systems:** Experience in real-time control systems, embedded computer systems, radar data processing, systems and unifield level diagnostics, and object discrimination classification.
- **Hardware Diagnostics:** Design/development of intelligent control panel systems, built-in-test, functional test, and microprocessor diagnostics for fault identification.

**AUTOMATIC TEST SYSTEMS ENGINEERS**

Design, test, and maintain automatic test programs for built-in test troubleshooting of military avionic systems. Desired plus related experience at automatic test equipment (ATE), background required. Previous experience in design, testing, and troubleshooting of ATE equipment also required. Experience with software engineering, test systems, test equipment, and development of software for computer-aided test systems is desirable.

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**ATS Systems Engineering:** Analysis, design hardware/software integration, support. Systems incorporate distributed networks with remote data base management.

**Test Program Set Development:** TPS design using automated test program generators, simulators and emulators in a variety of high level software languages.

**Hardware Design:** Analog, RF, microwave and digital circuit design for automated instrumentation including RF source and analog power supplies.

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**ADVANCED SYSTEMS ENGINEERS**

**Threat Analysis/EW Techniques Development:** Develop threat analysis and electronic warfare techniques development. Experience in radar/multipulse threat analysis, multi-function phased array/beamform systems, IR/RFurvey threat analysis and performance analysis. Experience in IR/RF, software, testing, development, and operation of advanced IRM, IRM/RFM, and IRM/RFM systems. Experience with advanced IRM, IRM/RFM, and IRM/RFM systems analysis.

**Threat Modeling & Simulation:** To support EW systems and technology development. Experience digital computer modeling and simulation of EMI/RFM, systems analysis of EW systems performance evaluations, real-time hardware-in-the-loop simulation IRM.

Interested individuals should forward resume with compensation history to: Supervisor, Staffing, Dept. C32, Northrop Corporation, Defense Systems Division, 500 Hough Road, Rolling Meadows, IL 60008. An equal opportunity employer/affirmative action/civil rights employer may be required for certain positions.
SURVEY RESPONDENTS

Hall Acuff
retired
San Jose, California

Pat Ashmore
Human Relations Administrator
ESL, Inc./a TRW subsidiary
Sunnyvale, California

Dolores Cooper
Human Resources Representative
The BDM Corporation
Tacoma, Washington

Bob Hungerford
Manager of Human Resources
Unisys
Santa Clara, California

Ed Kennedy
Manager Employee Relations/Staffing
Bell Northern Research
Mountain View, California

Greg Masters
Executive Recruiter/Owner
Master Search
Mill Valley, California

Janet Mellander
Technical Recruiter
Northrop/Defense Systems Division
Rolling Meadows, Illinois

Greg Page
Senior Technical Recruiter
The Foxboro Company
Foxboro, Massachusetts

Spencer Schatz
Senior Human Resources Representative
AVANTEK
Santa Clara, California
Jennifer Seader  
Recruiter  
Digital Equipment Corporation  
Colorado Springs, Colorado  

Dean Sharp  
Manager of Executive Recruitment  
Sverdrup Corporation  
St. Louis, Missouri  

Barbara Shaw  
Vice President  
Austin Knight Advertising  
Sausalito, California  

David Thomas  
Human Relations Manager  
Maxim Technologies, Inc.  
Santa Clara, California  

Kenneth Whelan  
Personnel Manager  
Acurex Corporation/Aerotherm Division  
Mountain View, California  

Mark Wong  
Vice President  
Bernard Hodes Advertising  
Palo Alto, California  

Ed Zakrzewski  
Manager of Employment/Training and Development  
General Instrument/Jerrold Division  
Hatboro, Pennsylvania
APPENDIX C

EXAMPLES OF ADVERTISEMENTS EXAMINED
If you're interested in hardware or software professional positions, looking for an environment that encourages new ideas and values talent and experience, we're here! MAD Intelligent Systems, Inc. is seeking individuals interested in developing 80386-based Reasoning Delivery Systems. These systems will enable AI, Expert Systems, and Symbolic computing to be more effectively integrated with conventional data processing.

**SENIOR HARDWARE ENGINEERS**

You will be responsible for the design and implementation of high performance computer systems, including design of new architectures. A BS in EE or equivalent and a related background would be helpful. Masters degree preferred.

**SENIOR SOFTWARE ENGINEER**

- **UNIX Internals**

You'll port UNIX V.3 to our 80386 machines and integrate advanced functionality such as X-windows and KCL. We require a BS/EE or equivalent and experience with UNIX internals, drivers and utilities. LISP and/or Database experience desirable.

- **LISP**

Using your expertise, you'll build graphics-based tools for developing software environments. Qualifications must include 4 years of experience in LISP and 2 years in UNIX and "C". An MSc or equivalent is also necessary.

**COMMUNICATION ENGINEER**

Responsibilities will include designing, developing and integrating, Datacommunications and LAN software. We require a BS/CS or equivalent. Experience with SNA, X.25, and IEEE 802 based protocols such as TCP/IP and NFS desirable. UNIX System V experience a real plus.

We offer excellent compensation and benefit plans including stock options. Please send resume indicating position desired to Professional Staffing, MAD Intelligent Systems, Inc., Dept. HTZ-87, 2950 Zanker Road, San Jose, CA 95134. BOE

UNIX is a trademark of Bell Labs.
SPACE VECTOR CORP.

Our company is an industry leader in rocket systems engineering and fabrication for research and SDIO applications. Our current long term programs require a few key individuals in Engineering. If you are one of the following, please send us a resume and salary history.

- **ELECTRONIC DESIGN ENGINEERS**
  Requires a minimum of 3 years experience in Analog and Digital Control Systems design & microprocessor, hardware/software applications.

- **QUALITY ENGINEER**
  With an understanding of quality planning for electromechanical devices in a MIL STD 9858A from design through production including configuration validation.

- **SENIOR PARTS ENGINEER**
  Knowledgeable with military requirements and application of electronic parts with emphasis on MIL M-38510 & MIL STD 883C for spacecraft usage. Minimum of 10 YEARS MILITARY space parts control experience. DEGREE: BSEE REQUIRED.

- **SOFTWARE ENGINEERS**
  Assembly level programming of Intel 8086/87 processors for real time control applications with intensive hardware interface. Will work with Intel and Microsoft development software. Knowledge of digital control systems and MS-2167 definite pluses.

If you enjoy a small company and hands-on working environment and have 3 or more years experience, we have an exciting opportunity for you. The above positions offer a high level of visibility with competitive salary/benefits.

U.S. CITIZENSHIP IS REQUIRED
ATTN: ENGINEERING OPPORTUNITIES
9340 Eton Ave.
Chatsworth, Calif. 91311
ENGINEERING OPPORTUNITIES

We are a leading manufacturer of Fire Alarm Control Systems with advanced technology installations in small and large buildings worldwide. We offer excellent career opportunity and competitive compensation package for the following positions:

SOFTWARE ENGINEER
Development of software for Real-Time Microprocessor Systems in Assembly and higher-level Languages. BSCS or BSEE plus 2-5 years experience required. 8051 Microprocessor experience desirable.

FIELD ENGINEER
Installation support, troubleshooting and test of advanced Fire Alarm Systems throughout the United States. Must have Technical Certificate and 5 years experience in service of Microprocessor Systems. 75% travel from New Haven base.

SENIOR TECHNICIAN
General support, test and documentation of advanced Fire Alarm Control Systems as part of a Design Team. ASEE or Technical Certificate and 5 years of experience in Microprocessor Electronics.

Send resume to:

Mr. Don Anderson
VP Engineering

Fire-Lite Alarms, Inc.

40 Albert Street
New Haven, CT 06504

SOFTWARE ENGINEERS

DENRO, Inc., designs, develops, manufactures and services voice and data switches for the FAA and the U.S. military. Our systems are known for reliability, flexibility, performance and quality. DENRO is currently recruiting for intermediate and senior-level individuals with a minimum of 2 years real-time software development with microprocessors. Structured data-flow oriented design and HOL experience (C, Pascal-ADA preferred) experience is required for both positions. Other requirements and duties are described below.

Responsibilities for SENIOR SOFTWARE ENGINEER will include system design, proposal preparation, customer liaison, requirements analysis and some supervisory duties. Experience in a DOD environment using MIL-STD-1679, 2167 or equivalent and at least a BSCS or BSEE are required. Experience with computer network protocols and PABX switching systems is a plus. A total of at least 5 years of experience is required.

Responsibilities for SOFTWARE ENGINEER will include translation of specification requirements into system design, documentation, coding and debugging. A BSEE or BSCS and 2 years of experience are required.

In addition to competitive salaries, DENRO offers a comprehensive benefits package. To apply, please send resume and salary requirements in confidence to:

DENRO, INC.
40 Albert Street
New Haven, CT 06504
Extending electronics technology beyond known limits is Varian's first and foremost goal. As part of this mission our Medical Products Division has pioneered linear acceleration, accumulating an impressive history of 'firsts' along the way. Our CLINAC® 1800 earned acclaim as the first switched-guide, mid-energy standing-wave dual x-ray accelerator capable of producing high dose rates for both low and high energy x-ray and electron beams.

Increased computerization and interfacing systems will all play major roles in tomorrow's radiotherapy accelerators. To stay at the forefront, we're expanding our division's expert hardware and software team with opportunities that offer start-to-finish project involvement.

**Software Engineers**

**Intermediate to Sr. Level**

- IBM ATs using "C", NOVELL and Excelan TCP/IP network protocols, BTREEVE ISAM, and windowing user interface technology.
- Realtime control systems, ASM86, "C", embedded CPU systems.

**Sr. Systems Engineer**

- Development of systems design and concepts, EE degreed.

See us at WESTECH  
Monday & Tuesday, April 13 & 14  
Santa Clara Convention Center

If unable to see us at WESTECH, forward your resume, indicating position of interest, to Varian Associates, Professional Employment, 611 Hansen Way, M/S C-102, Palo Alto, CA 94303. We are an equal opportunity employer.

**Software Engineer**

With experience in 80X86 and 68000 assembly language, real-time software systems, (C) programming or some combination of above. A BS degree in EE or CS or equivalent and 3-5 years experience is required. Please send resume and salary requirements to: Adcock, Inc., 700 Airport Way, Bapbone, ID 83208.
Software Engineers

CLARIS Corporation, Apple's new software subsidiary, is seeking creative, hands-on managers and engineers with text, graphics and database software development experience to develop Macintosh applications.

All positions require a BS (MS preferred) in Electrical Engineering or Computer Science or equivalent and 5+ years development experience using C, Pascal or 68000 assembly languages on bit mapped workstation applications like MacWrite™ or MacDraw™. Experience with Macintosh is desirable. In addition, management positions will require 10+ years in a supervisory capacity.

If you are motivated by direct involvement and the opportunity to make a meaningful contribution in a dynamic development environment with a unique start-up, send your resume with SALARY HISTORY AND REQUIREMENTS to CLARIS Corporation, Dept 115, 440 El Camino Avenue, Mountain View, CA 94043-1503. No phone calls, please.

CIMPOINT is a rapidly growing company in the field of factory automation. We develop and sell hardware and software products around PC-AT, IBM mainframe, DEC VAX, and Apollo computers. The following positions are currently open:

MATHEMATICIAN
The successful candidate must have a postgraduate degree in Mathematics with a strong background in spherical trigonometry, calculus, geometrics and analytics. Programming ability in Fortran or C is also required.

SOFTWARE ENGINEER
This position requires a BSEE, a CS degree or equivalent with experience in programming in C. Experience with Fortran, IBM/VM, IBM/MVS, VAX/VMS, or Apollo Aegis is helpful. Graphics experience is also a plus.

SOFTWARE ENGINEER
This position requires a BSEE, a CS degree, or equivalent with experience in database applications. Experience with IBM/VM, IBM/MVS, VAX/VMS, Apollo is helpful. C experience is a plus.

MANUFACTURING TECHNICIAN
This position requires a minimum of 2 years of technical school plus 2 years experience. Experience should include both board level and IC level trouble-shooting of digital logic and ability to use oscilloscope, logic analyzers and other test equipment. Experience with PC-AT class equipment and analog circuitry is a plus.

CIMPOINT is an equal opportunity employer and provides a non-smoking environment.

Send resume to:
PERSONNEL ADMINISTRATOR
CIMPOINT
1807 W. Braker Lane, Suite 8
Austin, TX 78758-3610
EOE
Qualified candidates will be contacted.
Due to planned growth, PHILIPS MEDICAL SYSTEMS, INC., a leader in diagnostic medical imaging, is currently seeking experienced Software Engineers for our Shelton, CT facility.

We have opportunities available for SENIOR SOFTWARE ENGINEERS and INTERMEDIATE SOFTWARE ENGINEERS in our MRI software development effort. As Senior Software Engineer you must have a Bachelors degree (Masters degree desirable) and at least 5 years of experience in software engineering. As an INTERMEDIATE SOFTWARE ENGINEER you must have a Bachelors degree and 3-5 years of experience in software engineering. The chosen individuals will be experienced with "C" programming language and VMS operating system for VAX computers. A technical or scientific background and understanding of magnetic resonance imaging applications is a definite plus.

A position also exists for an individual to work on the design and implementation of image processing and communication applications for a range of medical imaging systems. The successful candidate must be familiar with modern disciplined software design practices, from design specification phase through coding and system release. Experience with LANS and 68000 VME Bus systems running UNIX, distributed databases, and/or PC Network based systems is a definite plus. This position requires a four year college degree and a minimum of 3 years experience.

We provide excellent compensation and comprehensive benefits. Please forward resume with salary history and requirements in strict confidence to Employment Manager, PHILIPS MEDICAL SYSTEMS, INC., A NORTH AMERICAN PHILIPS COMPANY, 710 Bridgeport Avenue, Shelton, CT 06484. An Equal Opportunity Employer M/F/H/V. No Third Party Responses. Please.

Honeywell

SENIOR OR PRINCIPAL SOFTWARE ENGINEER

Honeywell Protection Services Division is currently seeking a Senior Software Engineer who enjoys the challenges and responsibilities of technical management and group leadership. As a member of our team, you will have the opportunity to become involved in developing real-time security monitoring systems in a state-of-the-art software development environment.

Position requires:
- BS degree with 5-7 years software development experience
- Good communication skills
- Familiarity with structured design techniques
- Use of high level languages

We offer a competitive salary and a comprehensive benefits package. Interested applicants should submit a resume and salary history to:

Honeywell
Protection Services Division
Human Resources Dept.
17275 Derian Avenue, Irvine, CA 92714
An Equal Opportunity Employer M/F
APPENDIX D

ADVERTISEMENT EVALUATION FORM
ADVERTISEMEN T EVALUATION FORM

[ ] newspaper  [ ] journal

title of publication ________________________________
date of publication ________________________________
section in which the ad appeared ____________________________
size of the ad ________________________________
job title ________________________________
company name ________________________________
company location ________________________________
[ ] classified
[ ] classified display
[ ] display
[ ] a clear and full, though brief, description of the job
[ ] full statement of required qualifications and experience
[ ] clear statement of the opportunities for advancement
[ ] a statement of, or a clue to the salary
[ ] the technology with which or on which the company is working
[ ] statement of "where the company is going," its technological vision
[ ] name of the company
[ ] other pertinent facts about the company
[ ] benefits
[ ] location
[ ] adjectives describing the job and the company